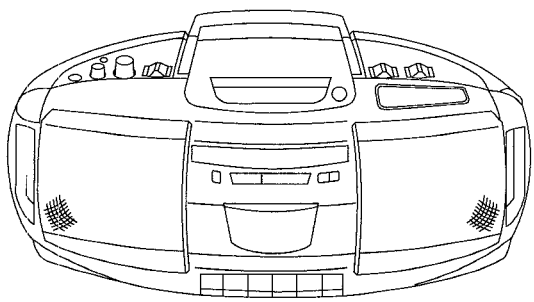
aiwa

aiwa SERVICE

CSD-ES225

SERVICE MANUAL



COMPACT DISC STEREO RADIO
CASSETTE RECORDER

- BASIC TAPE MECHANISM : TN-21ZSC-1685
- BASIC CD MECHANISM : 3ZG-2YD2NM

•TYPE: U,U1,U2,U3,LH

SPECIFICATIONS

<Tuner section>	
Frequency range	FM: 87.5MHz - 108.0 MHz Antenna: Rod antenna AM: 530kHz - 1,710 kHz Antenna: Ferrite bar antenna
<Deck section>	
Track format	4 tracks, 2 channels
Frequency range	Normal tape: 50 -12,500 Hz (EIAJ)
Recording system	AC bias
Erasing system	Magnet erase
Heads	Recording/playback head (1) Erasure head (1)
<CD player section>	
Disc	Compact disc
Scanning method	Non-contact optical scanner (semicondutor laser)
<General>	
Speaker	100 mm cone type (2)
Output	Headphones jack (stereo mini-jack)
Power output	2.5 W + 2.5 W (EIAJ 7 ohms. T.H.D. 10%)
Power requirments	DC 12 V using eight size C (R14) batteries U,U1,U2,U3: AC 120 V, 60Hz LH: AC 110 -120 V / 220 - 240 V AC, switchable, 50 / 60 Hz
Power consumption	U,U1,U2,U3:12 W LH: 14 W
Dimensions	450 (W) x 182 (H) x 227 (D)mm ($17^3/_4$ x $7^1/_4$ x 9 in.)
Weight	3.1 kg (6 lbs.13 oz.) (excluding batteries)

• Design and specifications are subject to change without notice.

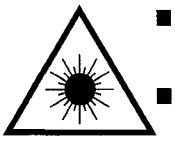
S/M Code No. 09-982-241-4FP

PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs laser Therefore, be sure to follow carefully the instructions below when servicing.

WARNING!!

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMISSION. BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.



- Caution: Invisible laser radiation when open and interlocks defeated avoid exposure to beam.
- Advarsel: Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

VAROITUS!

Laiteen Käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saataa altistaa käyt-täjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

VARNING!

Om apparaten används på annat sätt än vad som specificeras i denna bruksanvising, kan användaren utsättas för osynling laserstrålning, som överskrider gränsen för laserklass 1.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herin may result in hazardous radiation exposure.

ATTENTION

L'utillisation de commandes, réglages ou procédures autres que ceux spécifiés peut entraîner une dangereuse exposition aux radiations.

ADVARSEL

Usynlig laserstråling ved åbning, når sikkerhedsafbrydereer ude af funktion. Undgå udsættelse for stråling.

This Compact Disc player is classified as a CLASS 1 LASER product.
The CLASS 1 LASER PRODUCT label is located on the rear exterior.

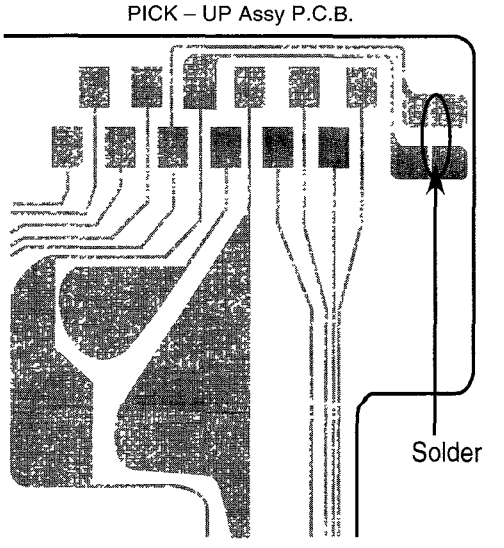
CLASS 1	LASER PRODUCT
KLASSE 1	LASER PRODUKT
LUOKAN 1	LASER LAITE
KLASS 1	LASER APPARAT

Precaution to replace Optical block

(KSS-213C)

Body or clothes electrostatic potential could ruin laser diode in the optical block. Be sure ground body and workbench, and use the clothes do not touch the diode.

1) After the connection, remove solder shown in right figure.



ELECTRICAL MAIN PARTS LIST

If can't understand for Description please kindly refer to " REFERENCE NAME LIST ".

REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
IC			
	87-A20-446-010		IC,LA9241M
	87-A20-187-010		IC,LC78622E
	87-A20-157-010		IC,TA2092N
	87-002-368-010		IC,NJM7805FA
	86-CD9-601-080		IC,LC6543F-4H30
	87-027-761-010		IC,AN7310
	87-001-702-080		IC,TA8127F(X)
	S8-382-270-000		IC,TA8227P
	87-A20-891-010		IC,MM1354BD
TRANSISTOR			
	87-026-463-010		TR,2SA933S
	89-112-964-010		TR,2SA1296GR
	87-026-291-010		TR,DTC124XS
	87-026-214-080		TR,DTA114YS
	89-304-583-010		TR,2SC458C
	S2-015-660-000		TR,2SB1566E/F
	S7-805-000-020		TR,PE8050B,C,D
	S7-855-000-020		TR,PE8550B,C
	89-318-154-080		TR,2SC1815GR
DIODE			
	S0-200-050-000		DIODE,1.5A 50V
	87-A40-246-080		DIODE,IN4148
	S0-100-221-200		ZENER,2.2V
	S0-100-821-200		ZENER,8.2V,1/2W
	S0-026-380-000		DIODE,1S2638
MAIN C.B			
C10	87-010-378-010		CAP,E 3300-25V
C12	87-010-384-010		CAP,E 100-25V
C101	87-010-038-010		CAP,E 22-25V
C110	87-010-053-810		CAP,E 1-50V
C118	87-010-545-010		CAP,E 0.22-50V
C120	87-010-038-010		CAP,E 22-25V
C121	87-010-403-010		CAP,E 3.3-50V
C129	87-010-380-010		CAP,E 47-16V
C131	87-010-263-080		ELECT CAP 100-10V
C132	87-010-037-010		CAP,E 10-50V
C133	87-010-053-810		CAP,E 1-50V
C136	87-010-263-080		ELECT CAP 100-10V
C138	87-010-248-080		ELECT CAP 220-10V
C140	87-010-380-010		CAP,E 47-16V
C146	87-010-380-010		CAP,E 47-16V
C151	87-010-263-080		ELECT CAP 100-10V
C155	87-010-376-010		CAP,E 2200-10V
C158	87-010-236-010		CAP,E 1000-10V
C160	87-010-221-010		CAP,E 470-10V
C162	87-010-053-810		CAP,E 1-50V
C164	87-010-037-010		CAP,E 10-50V
C165	87-010-037-010		CAP,E 10-50V
C175	87-010-404-010		CAP,E 4.7-50V
C176	87-010-545-010		CAP,E 0.22-50V
C301	87-010-404-010		CAP,E 4.7-50V
C302	87-010-404-010		CAP,E 4.7-50V
C307	87-010-404-010		CAP,E 4.7-50V
C308	87-010-404-010		CAP,E 4.7-50V
C311	87-010-263-080		ELECT CAP 100-10V
C312	87-010-263-080		ELECT CAP 100-10V
C341	87-010-248-080		ELECT CAP 220-10V
C342	87-010-376-010		CAP,E 2200-10V
C343	87-010-248-080		ELECT CAP 220-10V
C344	87-010-263-080		ELECT CAP 100-10V
C350	87-010-248-080		ELECT CAP 220-10V
C403	87-010-545-010		CAP,E 0.22-50V
C404	87-010-545-010		CAP,E 0.22-50V

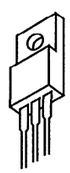
REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
C416	87-010-545-010		CAP,E 0.22-50V
C418	87-010-400-010		CAP,E 0.47-50V
C420	87-010-403-010		CAP,E 3.3-50V
C421	87-010-053-810		CAP,E 1-50V
C434	87-010-265-010		CAP,E 33-16V
C450	87-010-248-080		ELECT CAP 220-10V
C456	87-010-053-810		CAP,E 1-50V
C460	87-010-380-010		CAP,E 47-16V
C507	87-010-053-810		CAP,E 1-50V
C508	87-010-053-810		CAP,E 1-50V
C511	87-010-037-010		CAP,E 10-50V
C512	87-010-037-010		CAP,E 10-50V
C513	87-010-384-010		CAP,E 100-25V
C514	87-010-384-010		CAP,E 100-25V
C515	87-010-101-080		CAP,E 220-16V
C516	87-010-101-080		CAP,E 220-16V
C530	87-010-249-010		CAP,E 470-16V
C550	87-010-384-010		CAP,E 100-25V
C570	87-010-404-010		CAP,E 4.7-50V
C604	87-010-053-810		CAP,E 1-50V
C605	87-010-053-810		CAP,E 1-50V
C606	87-010-384-010		CAP,E 0.1-50V
C607	87-010-384-010		CAP,E 0.1-50V
C608	87-010-053-810		CAP,E 1-50V
C609	87-010-380-010		CAP,E 47-16V
C610	87-010-263-080		ELECT CAP 100-10V
C612	87-010-053-810		CAP,E 1-50V
C613	87-010-380-010		CAP,E 47-16V
C618	87-010-038-010		CAP,E 22-25V
C619	87-010-038-010		CAP,E 22-25V
CF410	S0-001-070-000		CER,FIL SFE-10.7MA5-M
CF430	S0-004-550-030		CER,FIL SFU455B
FC1	S1-601-401-000		CABL,FFC
JK1	S0-020-003-500		JACK,HP 3.5MM
L350	S0-036-300-100		IFT,4A363R(B)
L415	S0-012-100-100		IFT,7A121N 10MM
L416	S0-016-100-100		IFT,7A161R 10MM
L430	S1-101-231-000		AM COIL 4-100MM
L431	S0-086-400-100		IFT,1A864R,10MM
L432	S0-062-500-100		IFT,4A625F 10MM
L450	87-005-196-080		INDUCTOR,10UH
⚠ MF1	S0-250-100-010		FUSE,2.5A 125V
PVC1	S3-222-000-050		PVC,L2Z22CHTN AM/FM(CAW52LH)
SFR350	S1-030-850-000		SFR,10K
SFR410	S1-030-850-000		SFR,10K
SW1	S2-300-911-000		SW,SLIDE SKE01G9
SW2	S2-200-911-030		SW,SLIDE SK22J01G9 2A
SW8	S4-300-911-030		SW,SLIDE SK43D01G9AA
SW301	S0-092-200-000		SW,REC 9P2T 2MM
SW600	S2-203-220-000		SW,PB 2P2T
VR501	SE-145-031-030		RES,VARIABLE(50KDx2)
VR502	SE-145-031-030		RES,VARIABLE(50KDx2)
X1	S0-016-930-000		CER,RESO
CONTROL C.B			
C170	87-010-404-010		CAP,E 4.7-50V
C250	87-010-263-080		ELECT CAP 100-10V
C255	87-010-037-010		CAP,E 10-50V
C271	87-010-263-080		ELECT CAP 100-10V
C551	87-010-038-010		CAP,E 22-25V
SW250	SK-HH9-130-000		SW,PB(CSDSR510,515)
SW251	SK-HH9-130-000		SW,PB(CSDSR510,515)
SW252	SK-HH9-130-000		SW,PB(CSDSR510,515)
SW253	SK-HH9-130-000		SW,PB(CSDSR510,515)
SW254	SK-HH9-130-000		SW,PB(CSDSR510,515)
X250	S6-004-000-000		CER,RESO 4MHz CSA4.00MG

REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
DISPLAY C.B			
D257	87-070-106-010		LED,SE3001 RED
DP1	S0-036-110-000		DISPLAY,DIGIT LED SA36-11HWA
LAMP C.B			
D551	87-070-106-010		LED,SE3001 RED
BATT C.B			
DRIVE C.B			
M1	87-045-358-019		MOT,RF-310TA 43
M2	87-045-356-019		MOT,RF-310TA 30
SW1	87-A90-042-019		SW,LEAF MSW 17310 MVPO

TRANSISTOR ILLUSTRATION

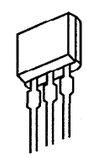
E C B

2SC1815
2SA1296



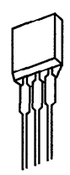
B C E

2SB1566



E C B

DTC124XS



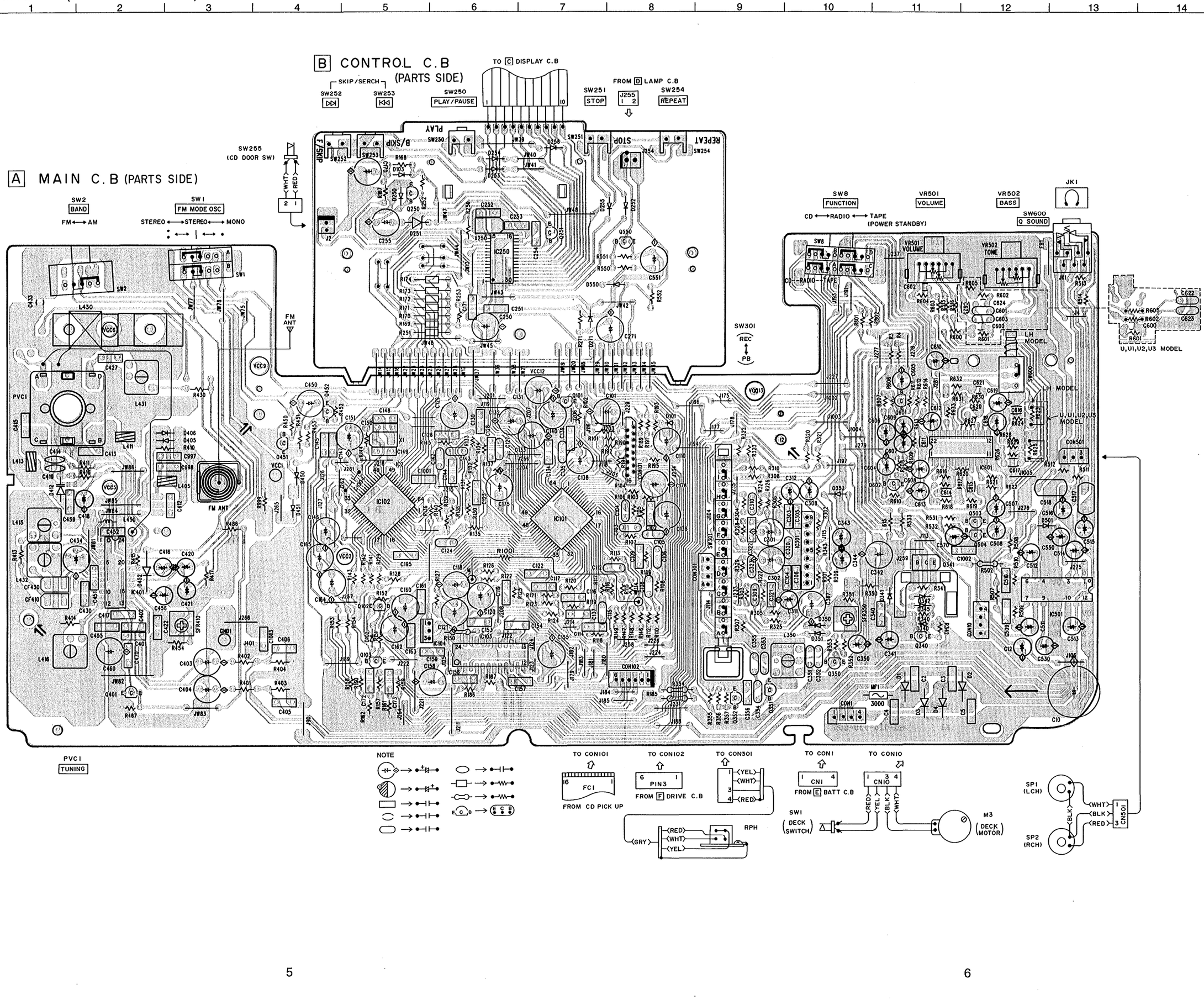
E C B

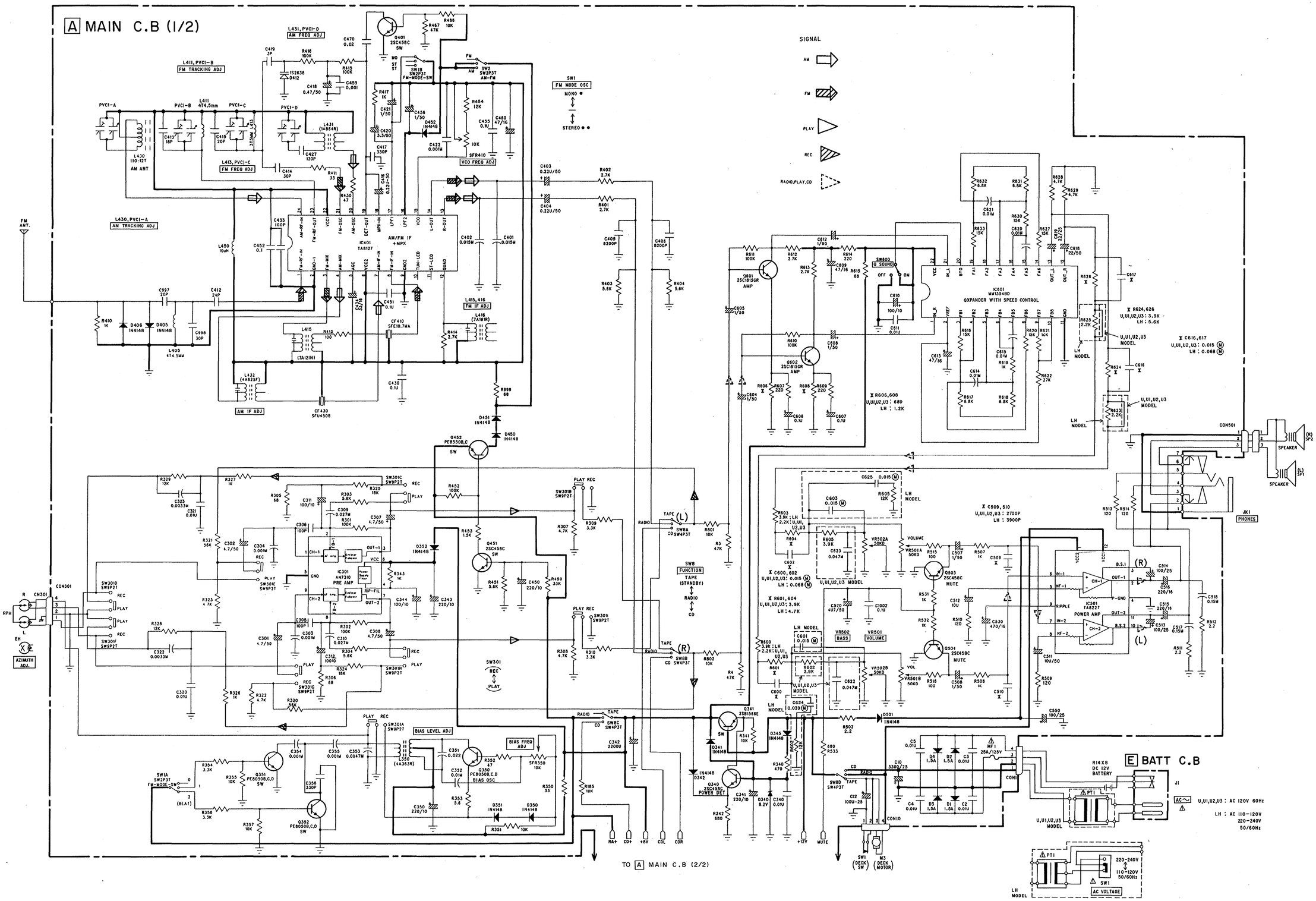
DTA114YS
2SA933

B C E

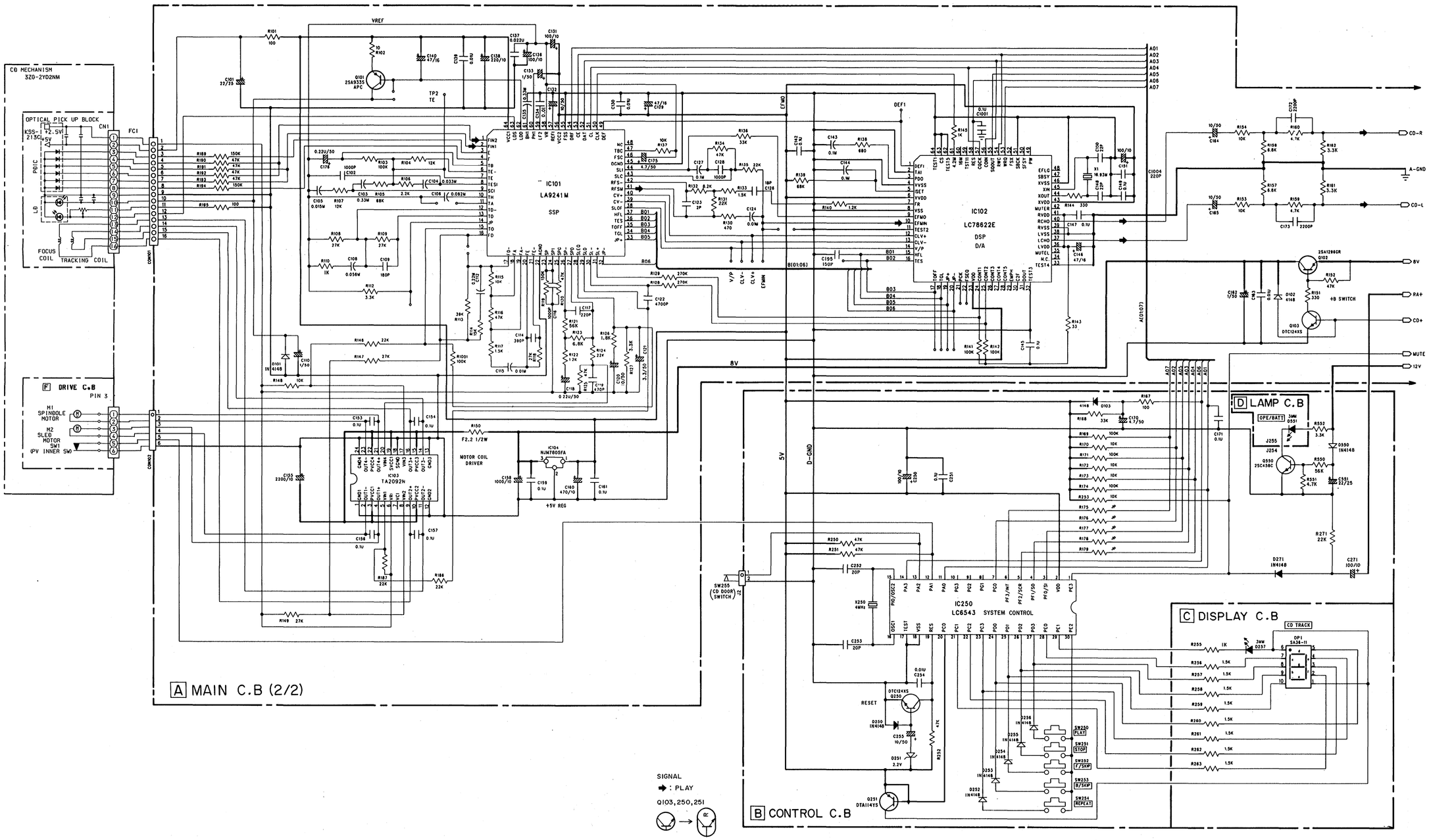
PE8550
PE8050
2SC458C

WIRING – 1 (MAIN / CONTROL)

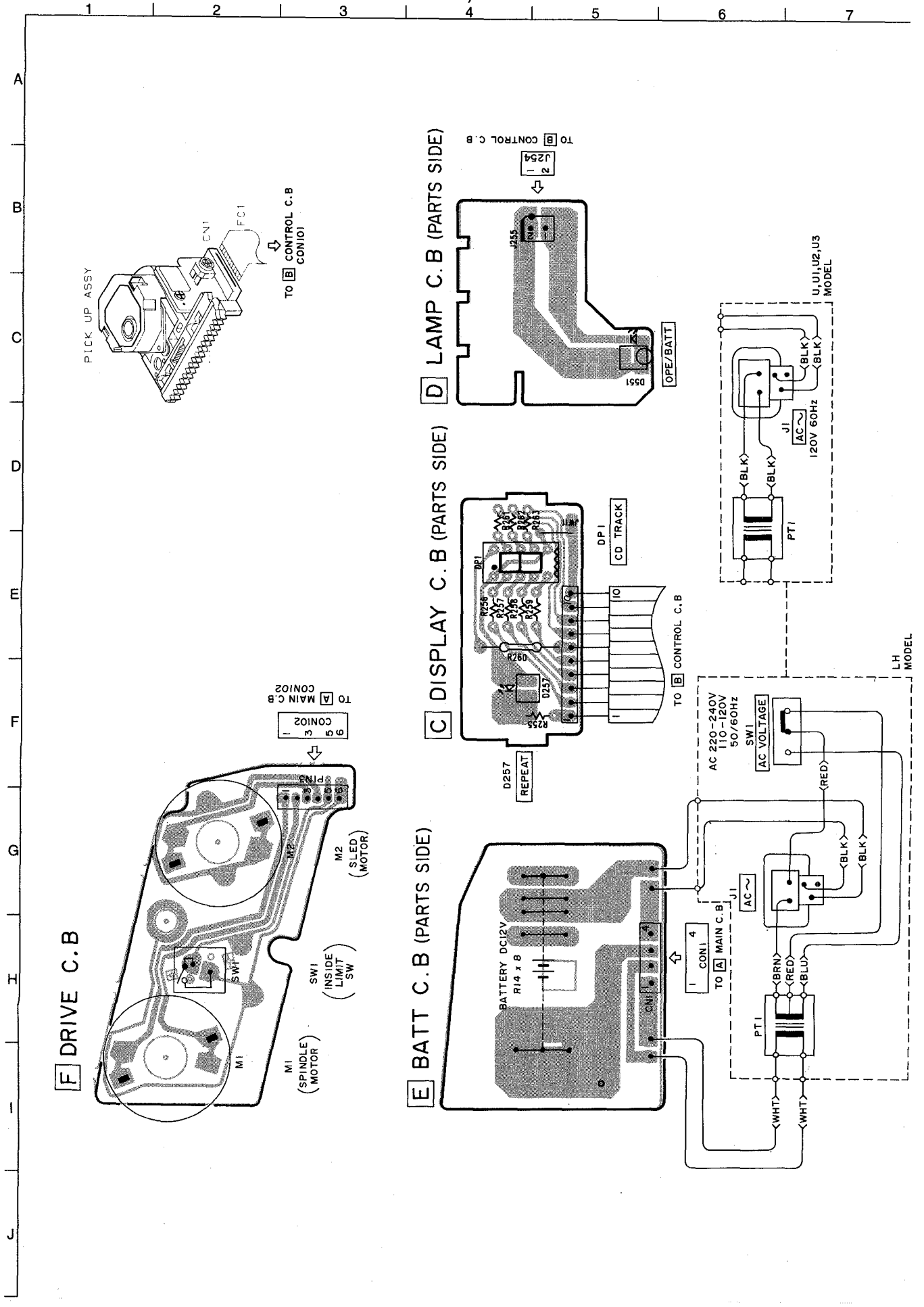



A MAIN C.B (1/2)
SIGNAL
AM
FM
PLAY
REC
RADIO,PLAY,CD
L431, PVCI-D
AM FREQ ADJ
L411, PVCI-B
FM TRACKING ADJ
L430, PVCI-A
AM TRACKING ADJ
L413, PVCI-C
FM FREQ ADJ
L415,416
FM IF ADJ
AM IF ADJ
VCO FREQ ADJ
BIAS LEVEL ADJ
BIAS FREQ ADJ
AZIMUTH ADJ.
SW1
FM MODE OSC
MONO
STEREO
SW2P3T AM-FM
SW1B SW3P3T FM-MODE-SW
SW8 FUNCTION
TAPE (STANDBY)
RADIO
CD
IC401 TA8127 AM/FM IF +MPX
IC301 AN7310 PRE AMP
IC601 MM1354BD EXPANDER WITH SPEED CONTROL
IC501 TA8227 POWER AMP
Q401 2SC458C SW
Q451 2SC458C SW
Q452 PE8550B,C SW
Q350 PE8050B,C,D BIAS OSC
Q351 PE8030B,C,D SW
Q352 PE8050B,C,D SW
Q340 2SC458C POWER DET
Q341 2SB1588E SW
Q501 2SC1815GR AMP
Q502 2SC1815GR AMP
Q503 2SC458C MUTE
Q504 2SC458C MUTE
CF410 SFE10.7MA
CF430 SFU450B
SFR410
SFR350 10K
VR501 VOLUME
VR502 BASS
VR502A 50KΩ
VR501A 50KΩ
VR501B 50KΩ
VR502B 50KΩ
SW600 O SOUND
SW301C SW9P2T
SW301B SW9P2T
SW301A SW3P2T FM-MODE-SW
SW3010 SW9P2T
SW301E SW9P2T
SW301F SW9P2T
SW301G SW9P2T
SW301H SW9P2T
SW301I SW9P2T
SW301J SW9P2T
SW8A SW4P3T
SW8B SW4P3T
SW8C SW4P3T
SW8D SW4P3T
CON301
CON501
CON10
JK1 PHONES
SPEAKER
AC~
E BATT C.B
R14X8 DC 12V BATTERY
U,U1,U2,U3 : AC 120V 60Hz
LH : AC 110-120V 220-240V 50/60Hz
220-240V
110-120V 50/60Hz
AC VOLTAGE
U,U1,U2,U3 MODEL
LH MODEL
X R606,608 U,U1,U2,U3 : 680 LH : 1.2K
X R600,601 U,U1,U2,U3 : 3.9K LH : 4.7K
X C600,602 U,U1,U2,U3 : 0.015 LH : 0.068
X C509,510 U,U1,U2,U3 : 2700P LH : 3900P
X R624,626 U,U1,U2,U3 : 3.9K LH : 5.6K
X C616,617 U,U1,U2,U3 : 0.015 LH : 0.068
TO A MAIN C.B (2/2)

SCHEMATIC DIAGRAM – 2 (MAIN 2/2 / CONTROL / DISPLAY / LAMP / DRIVE)

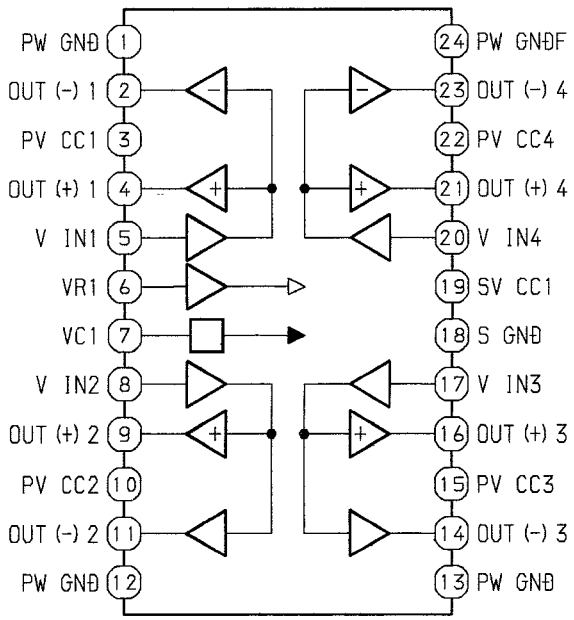


WIRING – 2 (DISPLAY / LAMP / BATT / DRIVE)

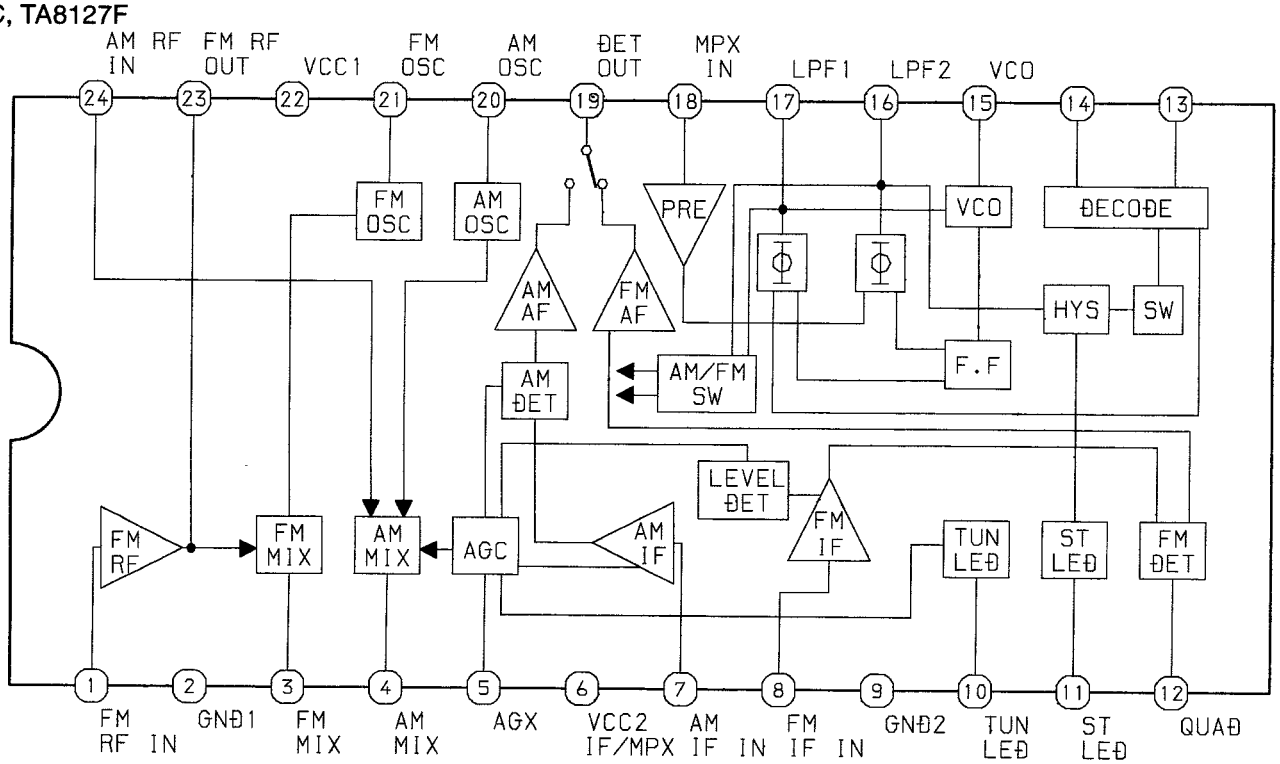


IC BLOCK DIAGRAM

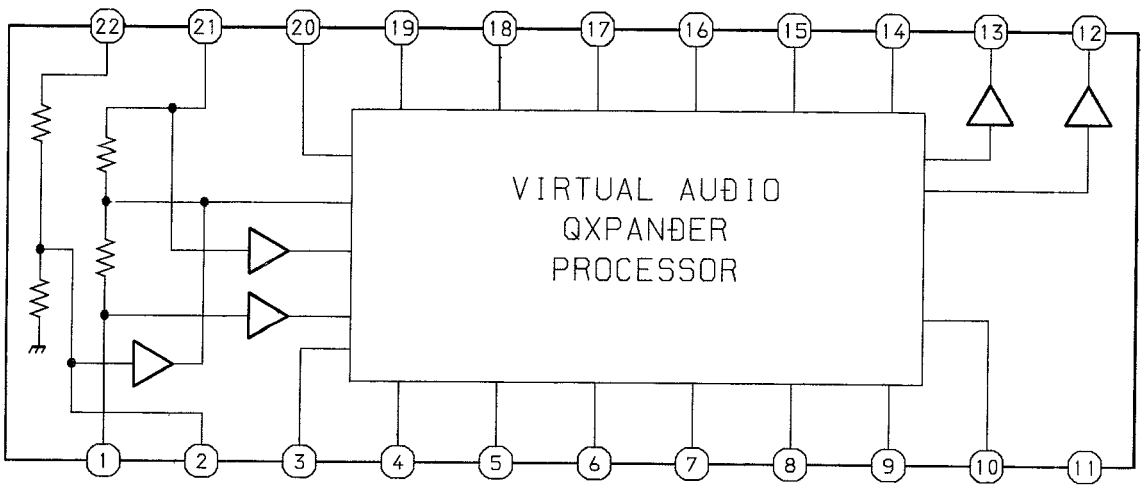
IC, TA2092



IC, TA8127F



IC, MM1354BD



VOLTAGE CHART

<CD SECTION>
TEST CONDITION: CD PLAY

IC101 (LA9240M)

PIN NO.	VOLTAGE (V)	PIN NO.	VOLTAGE (V)
1	2.46	33	0.05
2	2.46	34	4.80
3	2.48	35	0.05
4	2.51	36	0.79
5	2.47	37	0.05
6	2.47	38	0.05
7	2.47	39	0.05
8	2.47	40	0.33
9	2.47	41	2.39
10	2.45	42	2.37
11	2.45	43	2.53
12	2.45	44	2.47
13	2.42	45	0.04
14	2.48	46	2.47
15	2.52	47	2.47
16	2.35	48	0.0
17	2.47	49	0.04
18	2.50	50	2.41
19	2.47	51	4.20
20	2.44	52	4.30
21	2.47	53	0.07
22	0.03	54	4.70
23	2.45	55	0.04
24	2.45	56	4.80
25	2.44	57	2.47
26	2.48	58	2.47
27	2.64	59	2.60
28	2.47	60	2.66
29	2.57	61	2.20
30	2.30	62	3.65
31	2.30	63	0.22
32	0.05	64	4.80

IC102 (LC78622E)

PIN NO.	VOLTAGE (V)	PIN NO.	VOLTAGE (V)
1	0.04	33	0.0
2	0.04	34	0.0
3	1.57	35	0.05
4	0.04	36	4.10
5	1.62	37	1.79
6	4.80	38	0.0
7	0.36	39	0.0
8	0.04	40	1.78
9	2.47	41	4.10
10	2.53	42	0.05
11	0.04	43	4.80
12	0.32	44	2.17
13	0.05	45	2.10
14	0.04	46	0.04
15	0.06	47	0.14
16	0.80	48	0.07
17	0.05	49	0.14
18	4.80	50	2.43
19	0.05	51	0.04
20	0.05	52	2.43
21	2.41	53	0.50
22	4.80	54	0.07
23	4.80	55	0.10
24	0.05	56	4.30
25	0.05	57	4.20
26	0.27	58	4.80
27	0.20	59	0.05
28	0.20	60	2.56
29	0.05	61	2.36
30	0.05	62	0.04
31	2.44	63	0.04
32	0.04	64	0.04

IC103 (TA2092N)

PIN NO.	VOLTAGE (V)	PIN NO.	VOLTAGE (V)
1	0.0	13	0.0
2	0.62	14	0.70
3	1.60	15	1.60
4	0.75	16	0.70
5	0.42	17	0.42
6	0.50	18	0.0
7	0.70	19	1.60
8	0.50	20	0.50
9	0.70	21	0.80
10	1.60	22	1.60
11	0.70	23	0.60
12	0.0	24	0.0

IC250 (LC6543)

PIN NO.	VOLTAGE (V)	PIN NO.	VOLTAGE (V)
1	0.07	16	2.26
2	4.80	17	0.04
3	0.12	18	0.04
4	4.30	19	4.80
5	4.30	20	0.24
6	0.37	21	0.32
7	0.07	22	4.80
8	0.04	23	0.29
9	0.04	24	4.80
10	0.04	25	4.80
11	4.70	26	4.80
12	4.80	27	4.70
13	0.04	28	4.80
14	4.80	29	4.80
15	2.62	30	4.80

IC103 (TA2092N)

PIN NO.	1	2	3
VOLTAGE (V)	8.17	0.0	5.08

<TUNER SECTION>

TEST CONDITION: Set Tuner on one AM/FM frequency

IC401 (TA8127) A : AM , F = FM , no mark =AM/FM

PIN NO.	VOLTAGE (V)	PIN NO.	VOLTAGE (V)
1	A:0.0 , F:0.79	13	A:1.08 , F:1.06
2	0.0	14	A:1.09 , F:1.07
3	A:6.28 , F:5.77	15	A:5.65 , F:5.14
4	A:6.28 , F:5.75	16	A:6.35 , F:5.50
5	0.0	17	A:6.28 , F:5.76
6	A:6.28 , F:5.75	18	A:0.65 , F:0.64
7	A:6.22 , F:5.75	19	A:1.50 , F:1.15
8	A:6.28 , F:5.6	20	A:6.27 , F:5.70
9	0.0	21	A:6.27 , F:5.70
10	A:1.37 , F:1.57	22	A:6.28 , F:5.76
11	A:5.70 , F:5.27	23	A:6.28 , F:5.76
12	A:6.28 , F:5.77	24	A:6.29 , F:5.76

<CASSETTE & POWER SECTION>

TEST CONDITION: TAPE PLAY

IC301 (AN7310)

PIN NO.	VOLTAGE (V)	PIN NO.	VOLTAGE (V)
1	0.8	6	7.8
2	0.7	7	4.6
3	5.1	8	0.7
4	7.6	9	0.81
5	0.0	–	–

IC501 (TA8227)

PIN NO.	VOLTAGE (V)	PIN NO.	VOLTAGE (V)
1	13.0	7	0.0
2	6.60	8	0.58
3	13.0	9	6.40
4	0.0	10	12.5
5	0.58	11	1.60
6	0.0	12	13.50

IC600 (MM1354BD)
"Q"=QSOUND ON,"QF"=QSOUND OFF,no mark : common

PIN NO.	VOLTAGE (V)	PIN NO.	VOLTAGE (V)
1	3.68	12	3.70
2	3.69	13	3.70
3	3.69	14	3.70
4	3.69	15	3.69
5	3.69	16	3.70
6	3.69	17	3.69
7	3.69	18	3.70
8	3.70	19	3.69
9	3.70	20	Q:7.8 , QF:0.0
10	3.70	21	3.70
11	0.0	22	7.81

Q340 (2SC458C)

PIN NAME	E	C	B
VOLTAGE (V)	7.8	13.0	8.4

Q341 (2SB1566E)

PIN NAME	E	C	B
VOLTAGE (V)	13.5	8.6	13.0

Q350 (8050) REC

PIN NAME	E	C	B
VOLTAGE (V)	0.1	7.7	0.6

Q351 (8050)

PIN NAME	E	C	B
VOLTAGE (V)	0.0	0.55	0.0

Q352 (8050)

PIN NAME	E	C	B
VOLTAGE (V)	0.0	0.26	0.0

IC DESCRIPTION

IC, LC78622E

Pin No.	Pin Name	I/O	Description
1	DEFI	I	Defect detection signal (DEF) input. ("L" is applied when not used.)
2	TAI	I	For PLL/Test input. A pull-down resistor is incorporated.
3	PDO	O	Phase comparison output to control the external VCO.
4	VVSS	–	Ground of the built-in VCO. Normally, 0V.
5	ISET	I	For the connection of a resistor which adjusts the PDO output current.
6	VVDD	–	Power supply of the built-in VCO.
7	FR	I	Adjusts the VCO frequency range.
8	VSS	–	Ground of digital circuits. Normally, 0V.
9	EFMO	O	For slice level control/EFM signal output.
10	EFMIN	I	EFM signal input.
11	TEST2	I	Test input. A pull-down resistor is incorporated. Be sure to connect this to 0V.
12	CLV+	O	Disc motor control tri-state outputs.
13	CLV-		
14	V/P	O	Output to monitor the automatic switching between the rough servo control and phase servo control. "H" :Rough servo, "L": Phase servo.
15	HFL	I	Track detection signal input. Schmitt trigger input.
16	TES	I	Track error signal input. Schmitt trigger input.
17	TOFF	O	Tracking off output.
18	TGL	O	Tracking gain switching output. "L" raises the gain.
19	JP+	O	Track jump control tri-state outputs.
20	JP-		
21	PCK	O	Monitors the clock signal for EFM data playback.4.3218MHz when the phase is locked.
22	FSEQ	O	Sync signal detection output. Goes "H" when the sync signal detected from the EFM signal matches the sync signal generated internally.
23	VDD	–	Power supply of digital circuits.
24	CONT1	I/O	General purpose input/output 1. Controlled by serial data command issued by the microprocessor.
25	CONT2	I/O	General purpose input/output 2. Controlled by serial data command issued by the microprocessor.
26	CONT3	I/O	General purpose input/output 3. Controlled by serial data command issued by the microprocessor.
27	CONT4	I/O	General purpose input/output 4. Controlled by serial data command issued by the microprocessor.
28	CONT5	I/O	General purpose input/output 5. Controlled by serial data command issued by the microprocessor.
29	EMPH	O	Deemphasis monitor. "H": when playing a deemphasis disc.
30	C2F	O	C2 flag output.
31	DOUT	O	Outputs a digital OUT signal. (EIAJ format)
32	TEST3	I	Test input. A pull-down resistor is incorporated. Be sure to connect this to 0V.
33	TEST4		
34	N.C	–	Not used. Set to open.
35	MUTEL	O	Lch 1-bit DAC/Lch muting output.

Pin No.	Pin Name	I/O	Description
36	LVDD	–	Lch power supply.
37	LCHO	O	Lch output.
38	LVSS	–	Lch ground. Normally, 0V.
39	RVSS	–	Rch 1-bit DAC/Rch ground. Normally, 0V.
40	RCHO	O	Rch output.
41	RVDD	–	Rch power supply.
42	MUTER	O	Rch muting output.
43	XVDD	–	Power supply of crystal oscillator.
44	XOUT	O	For the connection of a 16.9344 MHz crystal oscillator.
45	XIN	I	
46	XVSS	–	Ground of crystal oscillator. Normally, 0V.
47	SBSY	O	Subcode block sync siganl output.
48	EFLG	O	C1,C2,single,duplex correction monitor.
49	PW	O	Output of subcodes P,Q,R,S,T,U and W.
50	SFSY	O	Subcode frame sync signal output. Falls when the subcode is set to the standby state.
51	SBCK	I	Subcode read-out clock input. Schmitt trigger input.("L" is applied when not used.)
52	FSX	O	7.35 kHz sync signal output obtained by diving the oscillator frequency.
53	WRG	O	Subcode Q standby output.
54	RWC	I	Read/write control input. Schmitt trigger input.
55	SQOUT	O	Subcode Q output.
56	COIN	I	Command input from the microprocessor.
57	CQCK	I	Command input retrieval clock or subcode retrieval clock input from SQOUT. Schmitt trigger input.
58	RES	I	LC78622 reset input. Set to "L" when power is supplied.
59	TST11	O	Test output. Set to open (normally, "L" output.)
60	16M	O	16.9344 MHz output.
61	4.2M	O	4.236 MHz output.
62	TEST5	I	Test input. A pull-down resistor is incorporated. Be sure to connect to 0 V.
63	CS	I	Chip select input. A pull-down resistor is incorporated.
64	TEST1	I	Test input with no pull-down resistor. Be sure to connect this to 0 V.

IC, LA9241M

Pin No.	Pin Name	I/O	Description
1	FIN2	O	For the connection of the pickup photodiode. Addition to the FIN1 pin creates an RF signal and subtraction from it create an EF signal.
2	FIN1	O	For the connection of the pickup photodiode.
3	E	O	For the connection of the pickup photodiode. Subtraction from the F pin creates a TE signal.
4	F	O	For the connection of the pickup photodiode.
5	TB	I	Inputs the DC components in the TE signal.
6	TE–	O	For the connection of a resistor which sets the gain of the TE signal between this pin and the TE pin.
7	TE	O	TE signal output.
8	TESI	I	TES (track error sense) comparator input.The TE signal is passed through a BPF.
9	SCI	I	Shock detection input.
10	TH	I	Sets the time constant for the tracking gain.
11	TA	O	TA amp output.
12	TD–	I	Composes the tracking phase compensation constant between the TD and VR pins.
13	TD	O	Sets the tracking phase compensation.
14	JP	I	Sets the amplitude of the tracking jump signal (kick pulses).
15	TO	O	Tracking control signal output.
16	FD	O	Focusing control signal output.
17	FD–	I	Composes the focusing phase compensation constant between the FD and FA pins.
18	FA	O	Composes the focusing phase compensation constant between the FD- and FA- pins.
19	FA–	I	Composes the focusing phase compensation constant between the FA and FE pins.
20	FE	O	FE signal output.
21	FE–	I	For the connection of a resistor whichs sets the gain of the FE signal between this pin and the TE pin.
22	AGND	O	Ground of analog signals.
23	SP	O	Single-ended output of the signals input to the CV+ and CV- pins.
24	SPI	I	Spindle amp input.
25	SPG	I	For the connection of a resistor which sets the gain in the spindle 12cm mode.
26	SP–	I	For the connection of the spindle phase compensation constant with the SPD pin.
27	SPD	O	Spindle control signal output.
28	SLEQ	I	For the connection of sled phase compensation constant.
29	SLD	O	Sled control signal output.
30	SL–	I	Sled feed signal input from the microprocessor.
31	SL+		
32	JP–	I	Tracking signal input from the DSP.
33	JP+		
34	TGL	I	Tracking gain control signal input from the DSP. Low gain when TGL is "H".
35	TOFF	I	Tracking off control signal input from the DSP. Off when TOFF is "H".
36	TES	O	Outputs the TES signal to the DSP.

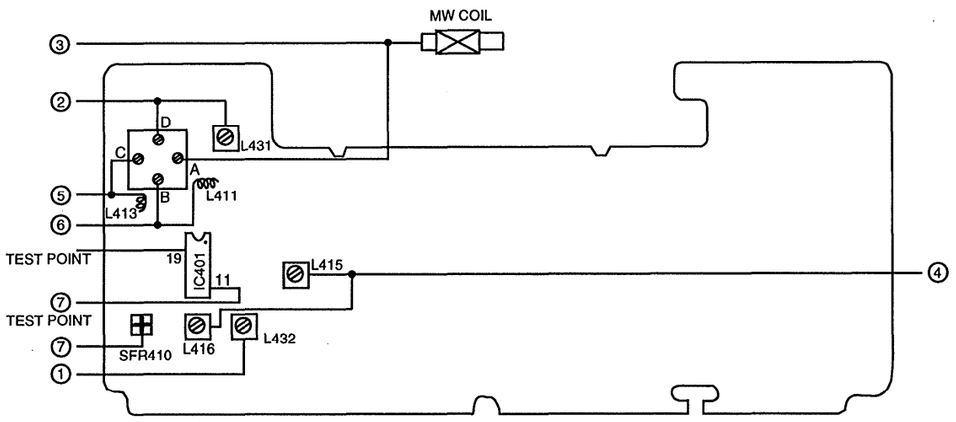
Pin No.	Pin Name	I/O	Description
37	HFL	O	The HFL (high frequency level) signal is used to judge whether the main beam is positioned on the pit or on the mirror.
38	SLOF	I	Sled servo off control input.
39	CV–	I	CLV error signal input from the DSP.
40	CV+		
41	RFSM	O	RF output.
42	RFS–	O	Sets the RF gain and the EFM signal's 3T componsation constant together with the RFSM pin.
43	SLC	O	The SLC (slice level control) signal is output to control the DSP's data slice level of the RF waveform.
44	SL1	I	Input to control the DSP's data slice level.
45	DGND	–	Ground of digital signals.
46	FSC	O	Output for the focus search smoothing capacitor.
47	TBC	I	The TBC (tracking balance control) signal sets the EF balance variation range.
48	NC	–	Not connected.
49	DEF	O	Dsic defect detection output.
50	CLK	I	Reference clock input. 4.23 MHz is input from the DSP.
51	CL	I	Microprocessor command clock input.
52	DAT	I	Microprocessor command data input.
53	CE	I	Microprocessor chip enable input.
54	DRF	O	DRF (detect RF) is an output to detect the RF level.
55	FSS	I	The FSS (focus search select) signal switches the focus search modes (+/-search / +search with respect to the reference voltage).
56	VCC2	–	VCC of servo and digital circuits.
57	REF1	–	For the connection of bypass capacitor for the reference voltage.
58	VR	O	Reference voltage output.
59	LF2	–	Sets the time constant for disc defect detection.
60	PH1	–	For the connection of a capacitor to hold the RF signal peak.
61	BH1	–	For the connection of a capacitor to hold the RF signal bottom.
62	LDD	O	APC circuit output.
63	LDS	I	APC circuit input.
64	VCC1	–	VCC of RF signal circuits.

IC, LC6543

Pin No.	Pin Name	I/O	Description
1	PE3	O	Audio muting output.
2	VDD	–	Power supply.
3	PF0/SI	I	Subcode Q data.
4	PF1/SO	O	DSP command output.
5	PF2/SCR	O	DSP command and subcode clock output.
6	PF3/INT	I	DSP code Q data reading request.
7	PCO	O	DSP command and subcode Q data reading completion.
8	PG1	O	Sled output signal. (Not connected)
9	PG2	O	Sled output signal. (Not connected)
10	PG3	–	Not connected.
11	PAO	I	H: FOCUS OK,L:NG.
12	PA1	I	Pickup detection. L: IN, H: OUT.
13	PA2	I	Lid detection. L: CLOSE, H: OPEN.
14	PA3	I	CD LSI reset detection. H: Reset completed.
15	P10/OSC2	–	4MHz oscillation pin.
16	OSC1	–	4MHz oscillation pin.
17	TEST	–	Test pin, connected to ground.
18	VSS	–	Power supply, connected to ground.
19	RES	I	System reset terminal.
20	PC0	O	Key dynamic scanning terminal.
21 ~ 23	PC0~PC3	O	Segment f~e output.
24 ~ 27	PD1~PD3	O	Segment a~c output.
28	PE0	O	Segment DP output.
29	PE1	O	REPEAT LED output.
30	PE2	I	Key input.

ADJUSTMENT – 1 <TUNER>

A MAIN C.B



1. AM IF Adjustment
   Test point: IC401(TA8127F) 19 PIN
   Adjustment Location: L432
   L432 ---------- 455 KHz

2. AM Frequency Range Adjustment
   Test point: IC401(TA8127F) 19 PIN
   Adjustment Location: L431, PVC1D
   L431 ---------- 515 KHz
   PVC1D ---------- 1650 KHz

3. AM Tracking Adjustment
   Test point: IC401(TA8127F) 19 PIN
   Adjustment Location: AM COIL, PVC1A
   AM COIL ---------- 600 KHz
   PVC1A ---------- 1400 KHz

4. FM IF Adjustment
   Test point: IC401(TA8127F) 19 PIN
   Adjustment Location: L415, L416
   L415, L416 ---------- 10.7 MHz

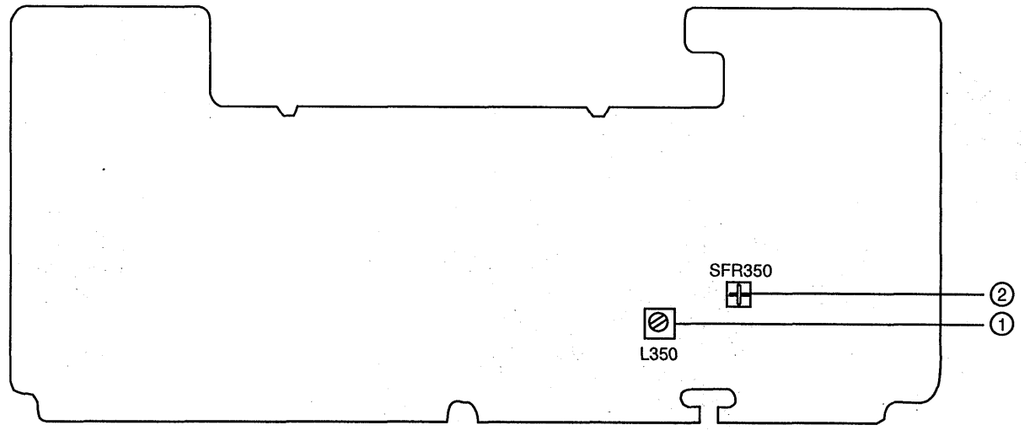
5. FM Frequency Range Adjustment
   Test point: IC401(TA8127F) 19 PIN
   Adjustment Location: L413, PVC1C
   L413 ---------- 87.5 MHz
   PVC1C ---------- 108.5 MHz

6. FM Tracking Adjustment
   Test point: IC401(TA8127F) 19 PIN
   Adjustment Location: L411, PVC1B
   L411 ---------- 90 MHz
   PVC1B ---------- 106 MHz

7. VCO Frequency Adjustment
   Test point: IC401(TA8127F) 11 PIN
   Adjustment Location: SFR410
   SFR410 ---------- 76±0.05 KHz

ADJUSTMENT – 2 <DECK>

A MAIN C.B



1. BIAS Frequency Adjustment
   Test point: L350 4 PIN
   Adjustment Location: L350
   L350 ---------- 60±1 KHz

2. BIAS Level Adjustment
   Test point: L350 4 PIN
   Adjustment Location: SFR350
   SFR350 ---------- 15±0.5 V

PRACTICAL SERVICE FIGURE

<TUNER SECTION>

<FM SECTION>

Sensitivity :	Less than 25dB
(IHF, THD 3%)	[at 88.0 / 98.0 / 108.0MHz]
Distortion :	Less than 1% [at 98.0MHz]
(at 54dB)	
Signal to noise ratio :	More than 51dB [at 88.0MHz]
(at 54dB)	More than 50dB [at 98.0MHz]
	More than 49dB [at 108.0MHz]
Intermediate frequency :	10.7MHz ± 0.3MHz

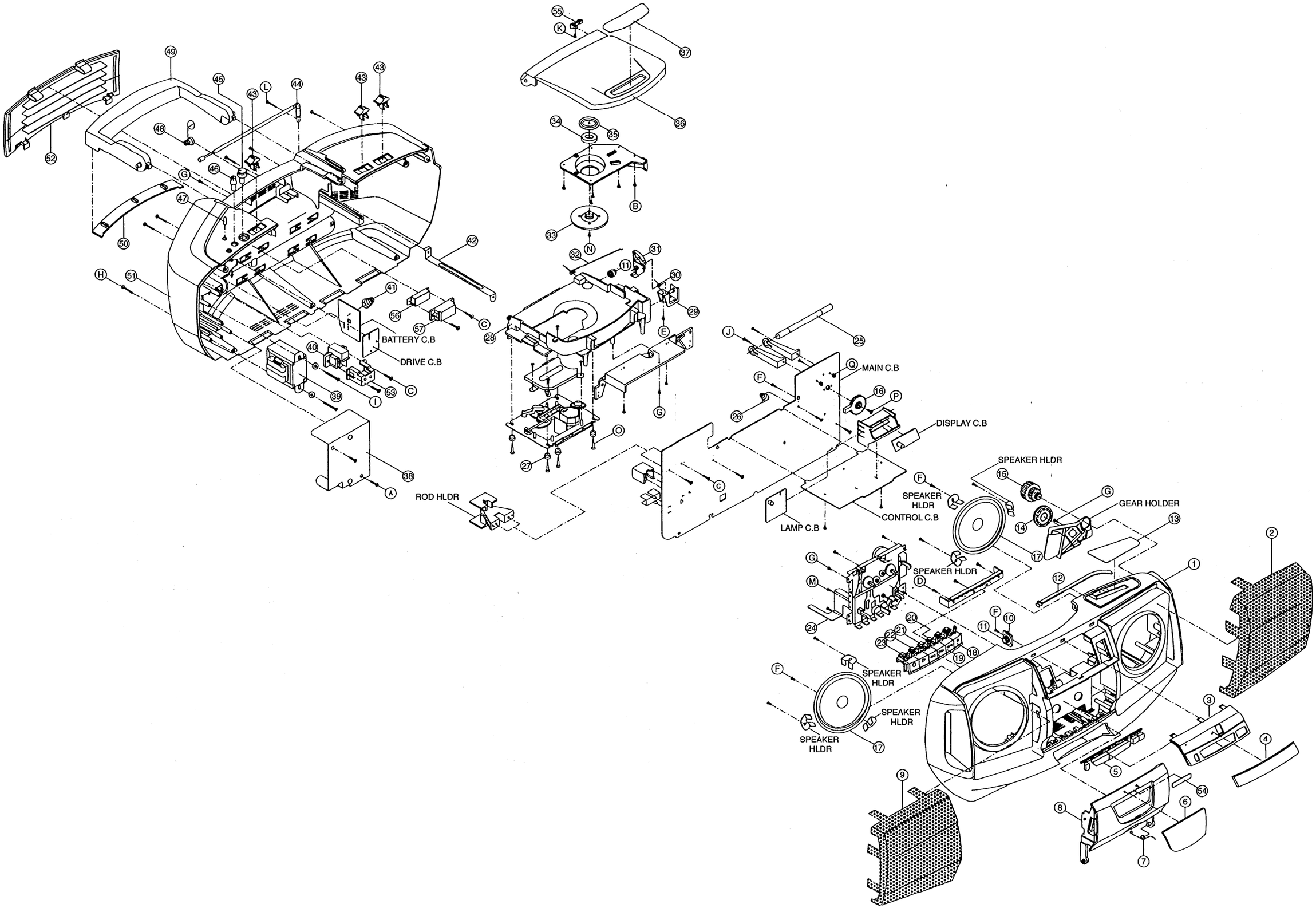
<AM SECTION>

Sensitivity :	Less than 50dB/m [at 600kHz]
(S/N 10dB)	Less than 47dB/m [at 1000kHz]
	Less than 52dB/m [at 1400kHz]
Distortion :	Less than 3%
(at 74dB)	
Signal to noise ratio :	More than 30dB/m [at 1000kHz]
(at 74dB)	
Intermediate frequency :	455kHz ± 5kHz

<TAPE SECTION>

Tape speed :	2940Hz ~ 3090Hz (MTT-111N)
Wow & flutter :	Less than 0.35% (MTT-111N)
Distortion :	Less than 3.0% (PB,MTT-118N)
	Less than 7.0% (REC)
Noise level :	50/40mV (Vol MAX, AC/DC)
	1.5/1.2mV (Vol MIN, PB/REC)
Channel separation :	35dB (W/O filter,MTT-141N)
Erasing ratio :	More than 45dB (MTT-121BN)
Signal to noise ratio :	More than 40dB (W/O filter,NTT-141N)
Crosstalk :	More than 35dB (W/O filter,MTT-121N)
Frequency response :	63Hz -6/-11dB ~ 10kHz -2/+10dB
	(MTT-257)
Test tape :	MTT-111N
	MTT-141N
	MTT-118N
	MTT-112BN
	NTT-141N
	MTT-257

MECHANICAL EXPLODED VIEW 1 / 1

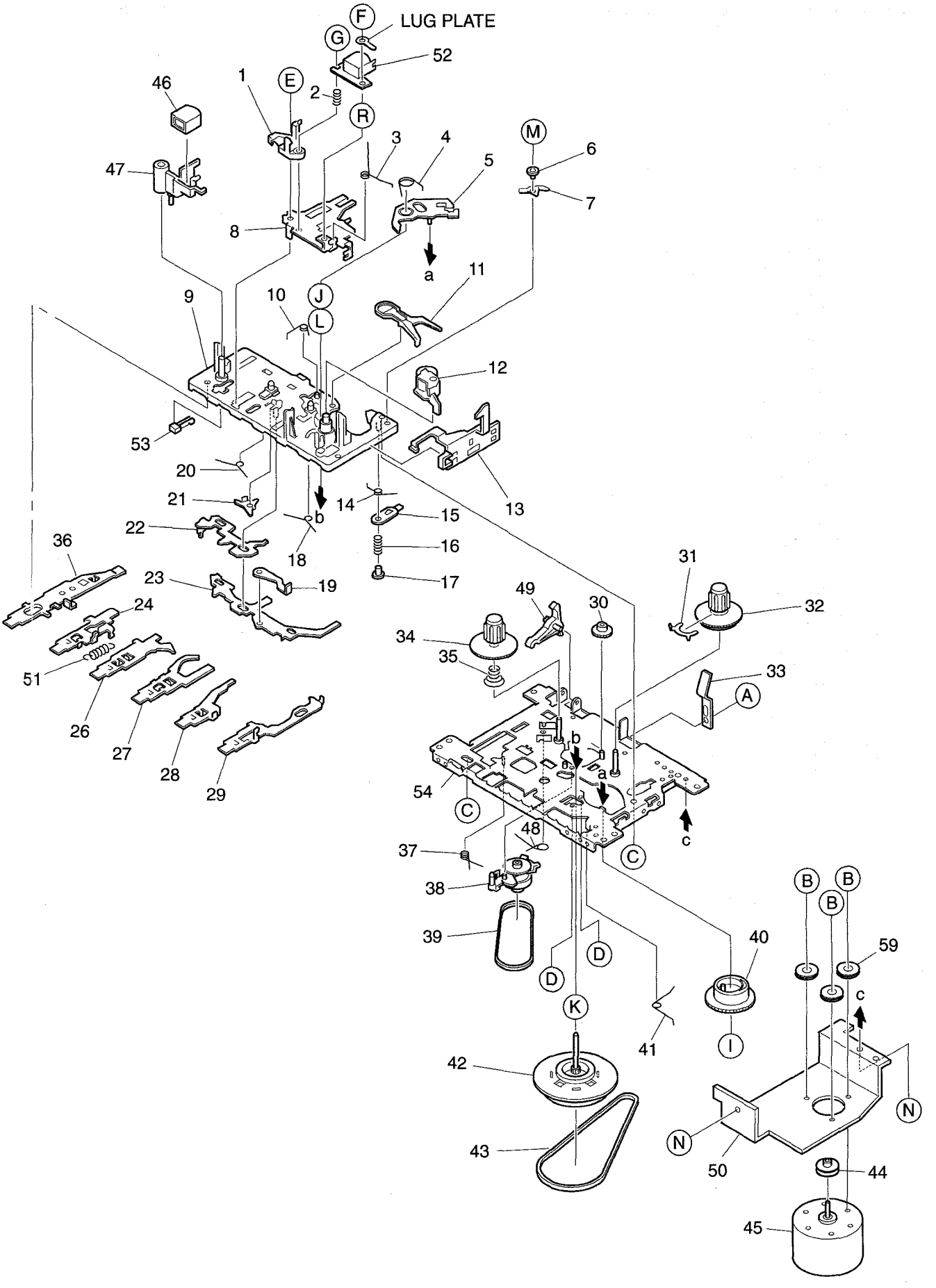


MECHANICAL PARTS LIST 1 / 1

If can't understand for Description please kindly refer to " REFERENCE NAME LIST ".

REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
1	S7-CD9-010-300		CAB,FRONT
2	S8-CD9-070-010		SPKR,GRILL(R)
3	S8-CD9-010-100		PANEL,FRONT
4	S8-CD9-030-100		WINDOW,DISPLAY
5	S8-CD9-020-100		KEY,CD CONTROL
6	S8-CD9-050-100		WINDOW,CASS
7	S7-CD9-380-000		SPR-T CASS
8	S8-CD9-040-010		DOOR,CASS
9	S8-CD9-060-010		SPKR,GRILL(L)
10	S7-69A-410-000		GEAR HOLDER
11	S7-69A-420-000		GEAR,769A-42
12	S7-CD9-240-000		POINTER
13	S7-CD9-350-200		WINDOW,TUNER
14	S7-CD9-210-000		RELAY GEAR
15	S7-CD9-200-020		KNOB,TUNER
16	S7-CD9-220-000		PVC GEAR
17	S4-080-030-150		SPKR (BLK)
18	S7-CD9-100-000		KEY,CASS PAUSE
19	S7-CD9-110-000		KEY,CASS STOP
20	S7-CD9-120-000		KEY,CASS F.F
21	S7-CD9-130-000		KEY,CASS REW
22	S7-CD9-140-000		KEY,CASS PLAY
23	S7-CD9-150-000		KEY,CASS REC
24	S6-110-480-000		LEVER,REC
25	S0-100-900-000		FERRI,BAR 10-90
26	S6-110-520-000		SPR,ANT ROD
27	S7-238-600-000		MAT CD CUSHION
28	S7-CD9-320-000		CHASSIS CD
29	S7-338-340-000		LOCK,DOOR(A)
30	S7-338-440-000		SPR,LOCK DOOR
31	S7-338-350-000		LOCK,DOOR(B)
32	S6-110-500-000		SPR,LID CD
33	S7-438-210-000		CHUCK,CD(BLK)
34	S0-075-380-000		MAGNET DOOR CD
35	S7-438-570-000		MOUNT,PLATE CHUCK CD
36	S7-CD9-030-500		DOOR,CD
37	S7-CD9-340-100		WINDOW CD
38	S2-838-080-000		TX COVER PLATE
⚠ 39	S3-530-301-300		POWER TRANS EI-48 115/230V<LH>
⚠ 39	S3-123-130-200		PT,TF EI-48/23 120V:11.3V<U,U1>
⚠ 40	S2-201-000-050		AC SOCKET 220V<LH>
⚠ 40	87-099-712-010		SOCKET,AC<U,U1>
41	S5-357-938-200		SPRING,BATT(-)
42	S6-110-470-000		LEVER,ANT
43	S7-CD9-050-000		KNOB,SLIDE
44	87-043-116-010		ROD ANTENNA
45	S7-CD9-070-000		KNOB,VOLUME
46	S7-CD9-080-000		KNOB,TONE
47	S7-CD9-310-010		BTN,BOOST BASS
48	S5-357-938-300		SPRING,BATT(+)
49	S7-CD9-040-030		HANDLE
50	S7-CD9-290-030		COVER HANDLE
51	S8-CD9-080-100		CAB,REAR
52	S7-CD9-250-030		DOOR,BATT
53	S2-838-070-000		AC SOCKET COVER BLK
54	S6-110-550-000		BADGE AIWA
55	S0-011-200-000		SW,LEAF LSA-1120Y
56	S1-200-000-030		SW,SLIDE SS12J01M-A-65<LH>
57	S2-838-080-000		VOLTAGE SW COVER<LH>
A	87-352-075-010		VT2+2.6-10
B	87-267-073-010		SCREW,2.6-6
C	87-841-034-410		SCREW,ST2-5MM PB
D	87-352-095-010		SCREW,ST3-8
E	87-251-094-410		SCREW,ST3-6
F	87-261-095-010		SCREW,ST3-8MM HEAD V5.9-6.3 BB
G	87-741-096-410		SCREW,ST3-10MM HEAD V5.9-6.3
H	87-741-102-410		VT2+3-20
I	87-743-103-410		SCREW ST3-25MM HEAD
J	87-261-095-410		V+3-8
K	87-841-035-410		SCREW ST2-6
L	87-741-096-010		SCREW,3-10MM PM
M	87-263-033-010		SCREW,2-4
N	87-263-033-010		SCREW,BM2-4
O	S0-472-380-010		SCREW,CD S2-17
P	87-743-073-410		SCREW,ST2.6-6
Q	S0-000-305-000		NUT,M3.5-0.5

TAPE MECHANISM EXPLODED VIEW 1 / 1

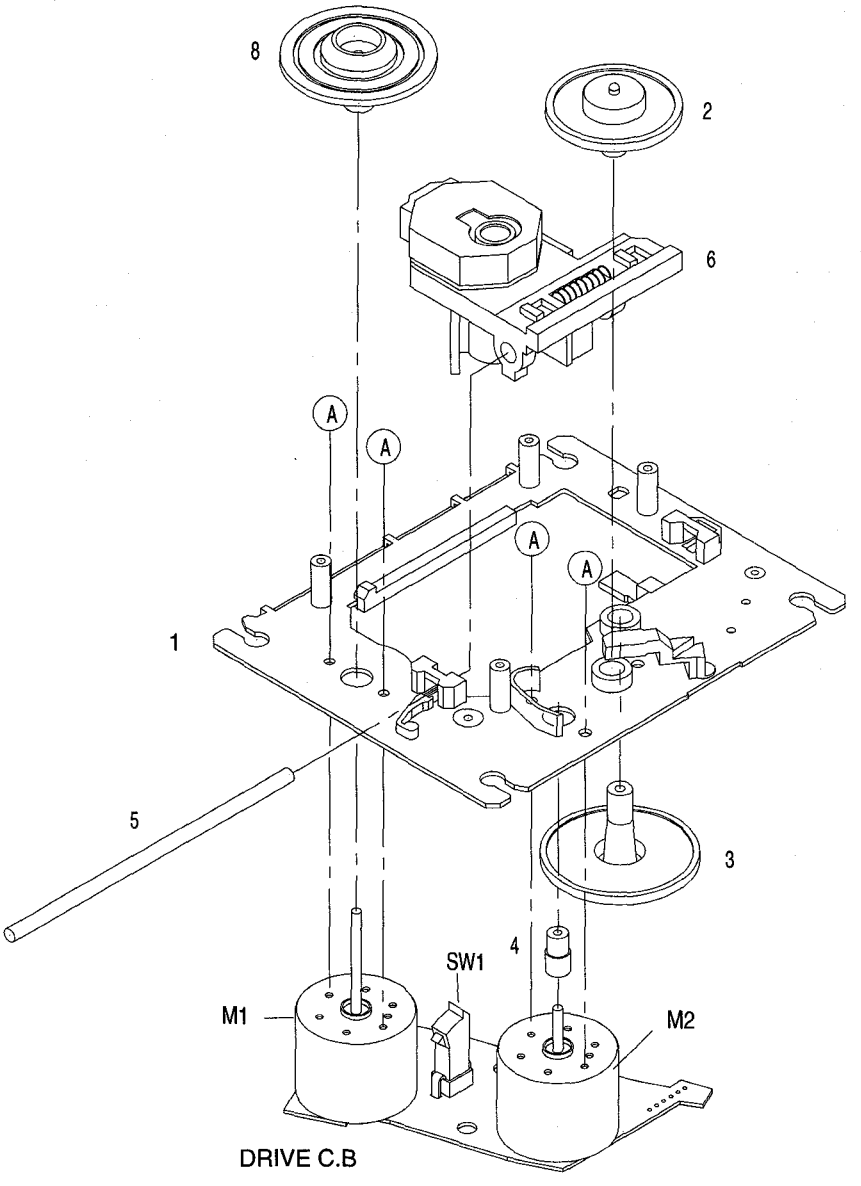


TAPE MECHANISM PARTS LIST 1 / 1

If can't understand for Description please kindly refer to " REFERENCE NAME LIST ".

REF. NO	PART NO.	KANRI NO.	DESCRIPTION
1	S1-921-030-4A0		HEAD BASE
2	S1-821-030-070		AZIMUTH SPRING
3	S1-921-030-090		PANEL P SPRING
4	S1-921-260-050		GEAR PLATE SPRING
5	S1-921-265-020		GEAR PLATE ASSY
6	S1-921-140-370		P ARM COLLER
7	S1-921-140-340		P ARM
8	S1-921-030-110		HEAD PANEL
9	S1-921-143-010		BASE ASSY
10	S1-921-141-8A0		M CONTROL SPRING
11	S1-921-260-4A0		SENSING LEVER
12	S1-921-043-090		PINCH ROLLER ARM ASY
13	S1-921-130-020		EJECT SLIDE LEVER
14	S1-921-141-3A0		P CONTROL SPRING
15	S1-921-140-550		PAUSE LEVER(E)
16	S1-921-140-120		PAUSE LEVER SPRING
17	S1-921-140-110		PAUSE STOPPER
18	S1-921-140-150		BUTTON LEVER SPRING(B)
19	S1-821-011-590		E KICK LEVER
20	S1-921-140-140		BUTTON LEVER SPRING(A)
21	S1-921-140-200		PR STOPPER
22	S1-921-140-090		SWITCH ACTUATOR
23	S1-921-140-080		PUSH BUTTON ACTUATOR
24	S1-921-140-230		PLAY BUTTON LEVER
26	S1-921-140-240		REW BUTTON LEVER
27	S1-921-140-250		FF BUTTON LEVER
28	S1-921-140-260		STOP BUTTON LEVER
29	S1-921-140-610		PAUSE BUTTON LEVER
30	S1-821-100-700		FF GEAR
31	S1-921-050-060		SENSER
32	S1-921-053-030		TAKE UP REEL ASSY
33	S1-829-100-010		PACK SPRING
34	S1-921-053-040		SUPPLY REEL ASSY
35	S1-821-100-990		BACK TENSION SPRING
36	S1-921-140-220		REC BUTTON LEVER
37	S1-921-140-170		P.S.LEVER SPRING
38	S1-921-073-080		RF CLUTCH ASSY
39	S1-921-070-030		RF BELT
40	S1-921-260-020		CAM GEAR
41	S1-921-140-160		E ACTUATOR SPRING
42	S1-921-093-030		FLYWHEEL ASSY
43	S1-921-090-040		MAIN BBELT
44	S1-921-120-010		MOTOR PULLEY
45	S6-002-030-220		MOTOR EG530AD-2B
46	S6-209-100-100		E HEAD PH-K380-MS1
47	S1-921-030-050		MG ARM
48	S1-921-140-210		REC BUTTON LEVER SPRING
49	S1-821-100-690		RECORD SAFETY LEVER
50	S1-921-120-540		MOTOR BRACKET
51	S1-821-010-500		PLAY BUTTON LEVER SPRING
52	S6-201-011-110		R.P HEAD
53	S6-401-011-490		LEAF SW MSW-1541T
54	S1-921-015-010		CHASSIS ASSY
59	S1-821-120-660		MOTOR RUBBER
A	S9-179-000-000		C TAPPING SCREW M2-3
B	S1-851-140-180		MOTOR COLLER SCREW
C	S9-679-000-000		P TAP SCREW M2-5
D	S9-999-180-090		TAP SCREW M2-4.5
E	S9-004-000-000		SCREW M2-6
F	S9-115-000-000		+ BIND SCREW M2-3
G	S9-922-000-000		AZIMUTH SCREW M2-8
I	S9-422-000-000		P WASHER CUT 12-3.8-0.3
J	S9-999-030-130		P WASHER CUT 1.45-3.8-0.
K	S9-882-000-000		P WASHER 2-3.5-0.4
L	S9-999-000-030		P WASHER2.1-4-0.13
M	S9-999-200-410		P TAP SCREW M2-3
N	S9-180-000-000		C TAPPING SCREW M2-4
R	S9-539-000-000		Y WASHER B S 0.2T

CD MECHANISM EXPLODED VIEW 1 / 1



CD MECHANISM PARTS LIST 1 / 1

If can't understand for Description please kindly refer to " REFERENCE NAME LIST ".

REF. NO	PART NO.	KANRI NO.	DESCRIPTION
1	83-ZG2-202-71K		O-SERT S ASSY,S
2	83-ZG2-204-419		GEAR,A
3	83-ZG2-205-219		GEAR,B
4	83-ZG2-220-01K		GEAR MOTOR 2
5	83-ZG2-240-019		SHAFT,SLIDE 3
6	87-A90-468-010		PICK-UP,KSS-213C
8	83-ZG2-226-11K		TURN TABLE,B3
A	87-261-032-219		SCREW V+2-3

ACCESSORIES / PACKAGE LIST

If can't understand for Description please kindly refer to " REFERENCE NAME LIST ".

REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
1	S8-CD9-910-200		INSTRUCTION BOOK(ES)<LH,U1>
1	S8-CD9-910-100		INSTRUCTION BOOK(ESF)<U,U2,U3>
2	S2-201-100-030		CORD,POWER 2.5A<LH>
2	S1-171-101-010		CORD,POWER SET<U,U1,U2,U3>
3	S0-220-117-000		CONVERTOR 220V-117V<LH>

REFERENCE NAME LIST

ELECTRICAL SECTION

DESCRIPTION	REFERENCE NAME
ANT	ANTENNAS
C-	CHIP
C-CAP	CAP, CHIP
C-CAP TN	CAP, CHIP TANTALUM
C-COIL	COIL, CHIP
C-DI	DIODE, CHIP
C-DIODE	DIODE, CHIP
C-FET	FET, CHIP
C-FOTR	FILTER, CHIP
C-JACK	JACK, CHIP
C-LED	LED, CHIP
C-RES	RES, CHIP
C-SFR	SFR, CHIP
C-SLIDE SW	SLIDE SWITCH, CHIP
C-SW	SWITCH, CHIP
C-TR	TRANSISTOR, CHIP
C-VR	VOLUME, CHIP
C-ZENER	ZENER, CHIP
CAP, CER	CAP, CERA-SOL
CAP, E	CAP, ELECT
CAP, M/F	CAP, FILM
CAP, TC	CAP, CERA-SOL
CAP, TC-U	CAP, CERA-SOL SS
CAP, TN	CAP, TANTALUM
CERA FIL	FILTER, CERAMIC
CF	FILTER, CERAMIC
DL	DELAY LINE
E/CAP	CAP, ELECT
FILT	FILTER
FLTR	FILTER
FUSE RES	RES, FUSE
MOT	MOTOR
P-DIODE	PHOTO DIODE
P-SNSR	PHOTO SENSER
P-TR	PHOTO TRANSISTOR
POLY VARI	VARIABLE CAPACITOR
PPCAP	CAP, PP
PT	POWER TRANSFORMER
PTR, RES	PTR, MELF
RC	REMOTE CONTROLLER
RES NF	RES, NON-FLAMMABLE
RESO	RESONATOR
SHLD	SHIELD
SOL	SOLENOID
SPKR	SPEAKER
SW, LVR	SWITCH, LEVER
SW, RTRY	SWITCH, ROTARY
SW, SL	SWITCH, SLIDE
TC CAP	CAP, CERA-SOL
THMS	THERMISTOR
TR	TRANSISTOR
TRIMER	CAP, TRIMMER
TUN-CAP	VARIABLE CAPACITOR
VIB, CER	RESONATOR, CERAMIC
VIB, XTAL	RESONATOR, CRYSTAL
VR	VOLUME
ZENER	DIODE, ZENER

MECHANICAL SECTION

DESCRIPTION	REFERENCE NAME
ADHESHIVE	SHEET ADHESHIVE
AZ	AZIMUTH
BAR-ANT	BAR-ANTENNA
BAT	BATTERY
BATT	BATTERY
BRG	BEARING
BTN	BUTTON
CAB	CABINET
CASS	CASSETTE
CHAS	CHASSIS
CLR	COLLAR
CONT	CONTROL
CRSR	CURSOR
CU	CUSHION
CUSH	CUSHION
DIR	DIRECTION
DUBB	DUBBING
FL	FRONT LOADING
FLY-WHL	FLYWHEEL
FR	FRONT
FUN	FUNCTION
G-CU	G-CUSHION
HDL	HANDOL
HIMERON	CLOTH
HINGE, BAT	HINGE, BATTERY
HLDR	HOLDER
HT-SINK	HEAT SINK
IB	INSTRUCTION BOOKLET
IDLE	IDLER
IND, L-R	INDICATOR, L-R
KEY, CONT	KEY, CONTROL
KEY, PRGM	KEY, PROGRAM
KNOB, SL	KNOB, SLIDE
LBL	LABEL
LID, BATT	LID, BATTERY
LID, CASS	LID, CASSETTE
LVR	LEVER
P-SP	P-SPRING
PANEL, CONT	PANEL, CONTROL
PANEL, FR	PANEL, FRONT
PRGM	PROGRAM
PULLY, LOAD MO	PULLY, LOAD MOTOR
RBN	RIBBON
S-	SPECIAL
SEG	SEGMENT
SH	SHEET
SHLD-SH	SHIELD-SHEET
SL	SLIDE
SP	SPRING
SP-SCREW	SPECIAL-SCREW
SPACER, BAT	SPACER, BATTERY
SPR	SPRING
SPR-P	P-SPRING
SPR-PC-PUSH	P-SPRING, C-PUSH
T-SP	T-SPRING
TERM	TERMINAL
TRIG	TRIGGER
TUN	TUNING
VOL	VOLUME
W	WASHER
WHL	WHEEL
WORM-WHL	WORM-WHEEL

サービス技術ニュース	
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